Neoplasm

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Overview

- Definition
- Types
- Mechanism
- Examples

- Cancer

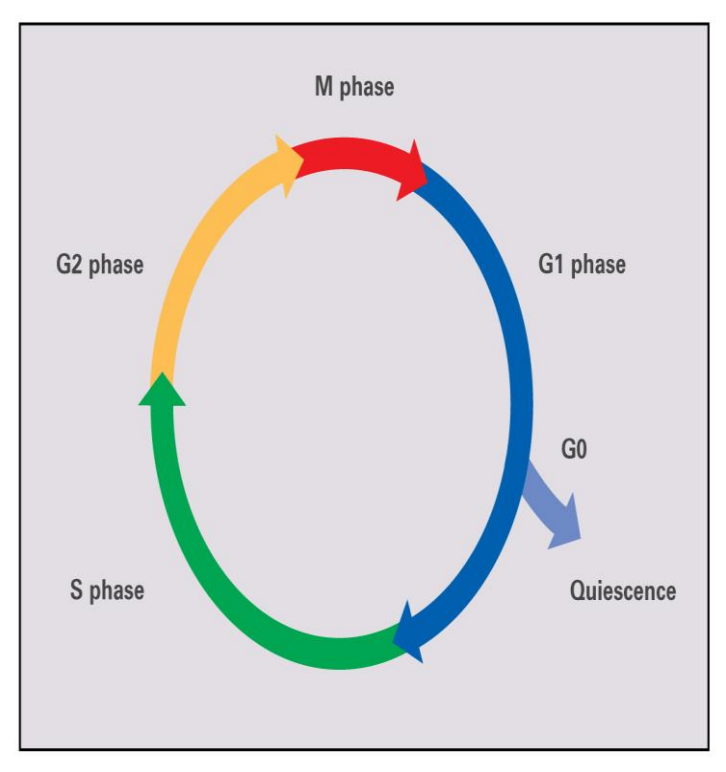
Ackowledgement: some slides modified from lecture by Prof R A Walker, Leicester Warwick Medical School

Definition

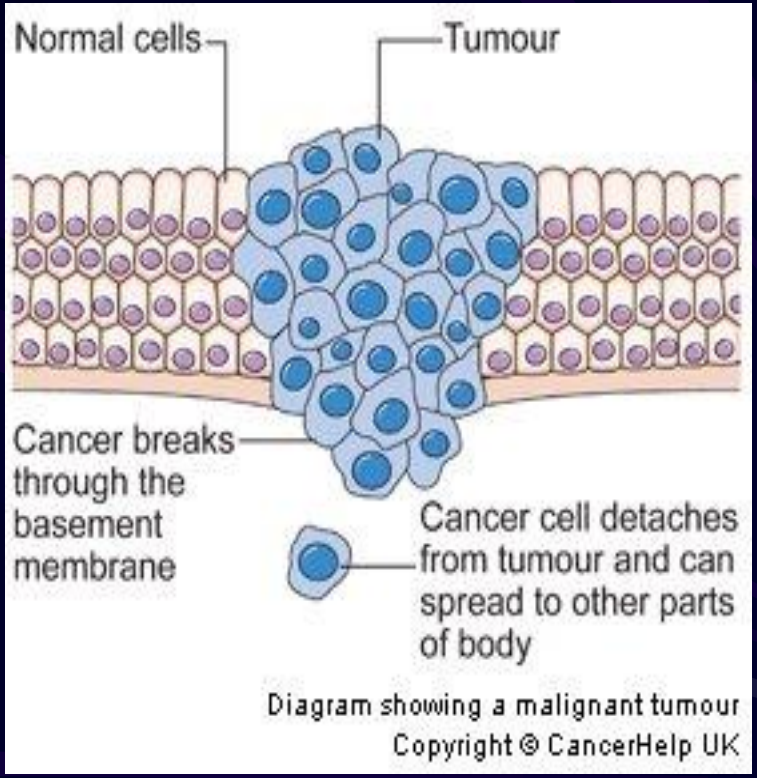
- *Neo* = new
- *Plasma* = formation

- Tumour = *tumere* = to swell

Cell cycle



Basement membrane



Definition

- Abnormal growth of cells which persists after initiating stimulus has been removed
- Cell growth has escaped from normal regulatory mechanisms

Types

- Benign

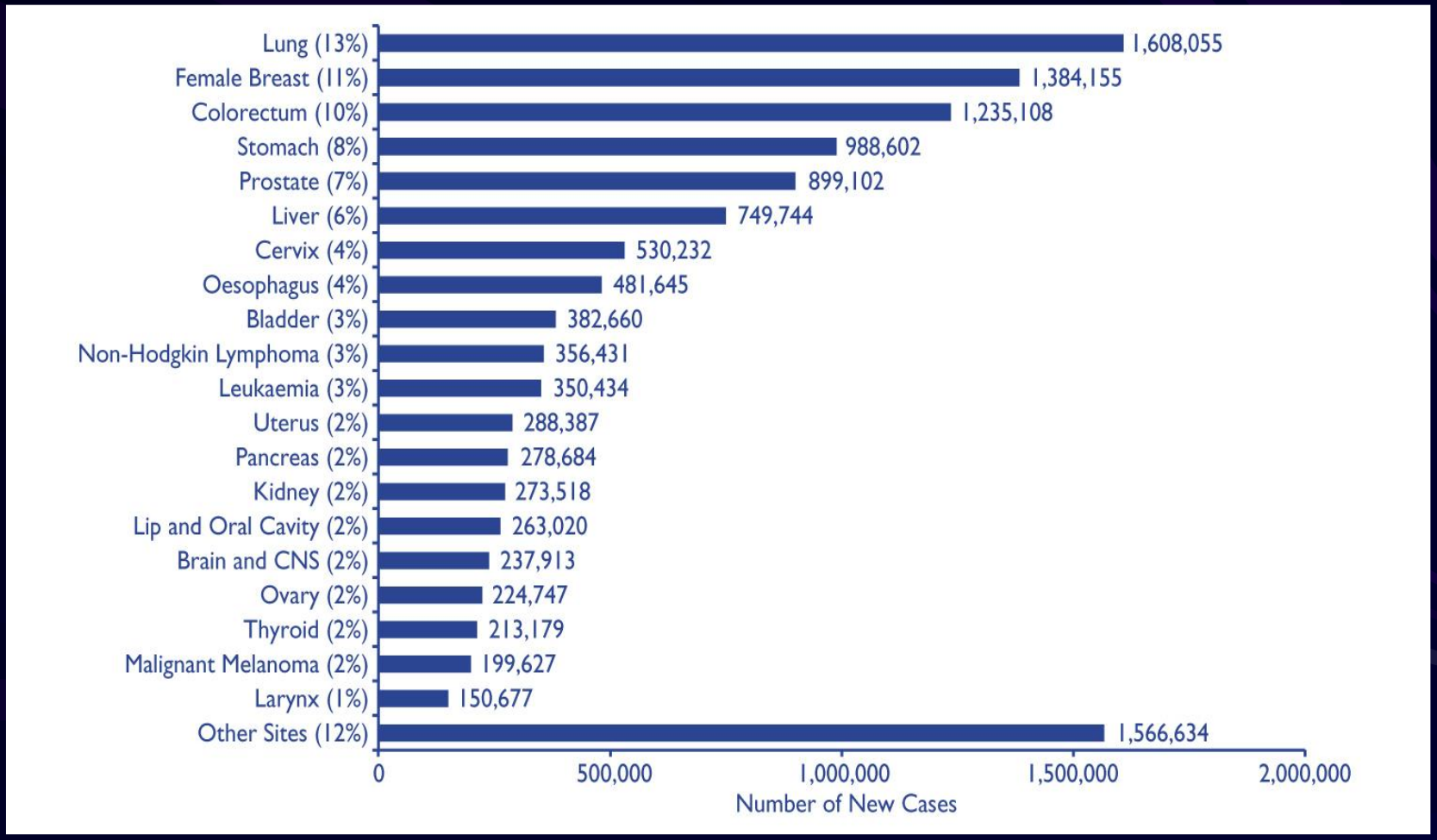
Cells grow as a compact mass and remain at their site of origin

- Malignant

Growth of cells is uncontrolled. Cells can spread into surrounding tissue and to distant sites

Malignant neoplasm = cancer

Figure One: The 20 Most Commonly Diagnosed Cancers Worldwide, 2008 Estimates



Development

- A change to DNA
- Causing alteration in cell growth and behaviour
- The change is non-lethal and passed on to daughter cells

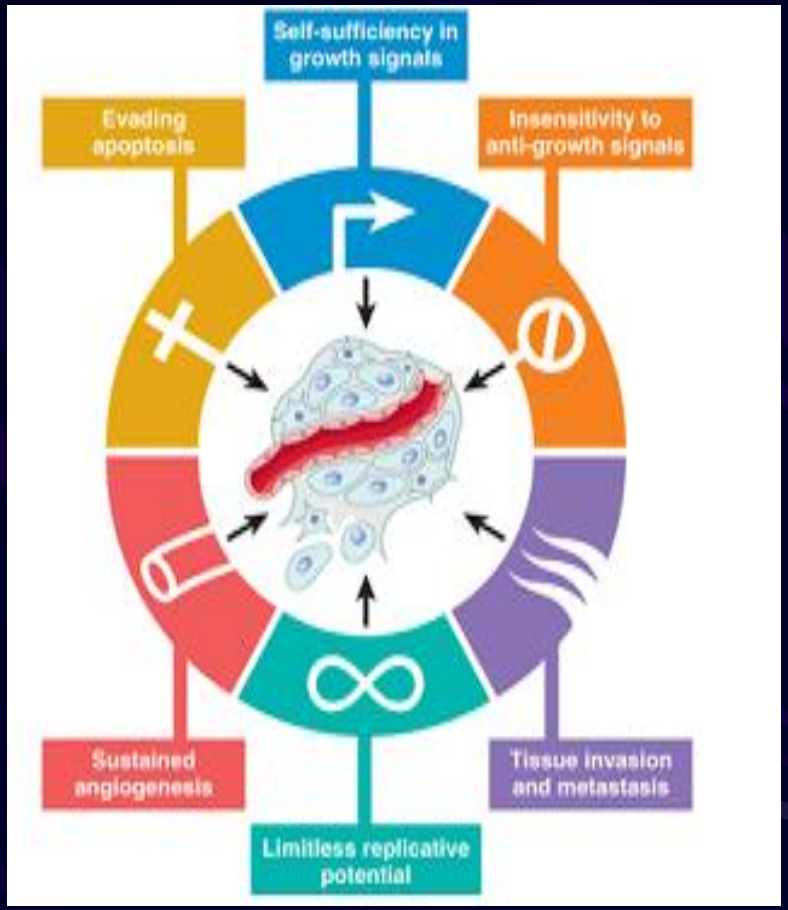
Development

- Oncogenes or tumour suppressor genes
- Sequence of gene alterations from normal to benign to malignant
- Intrinsic and extrinsic (inheritance and environment) key factors

Neoplastic cells

- Alterations in growth control

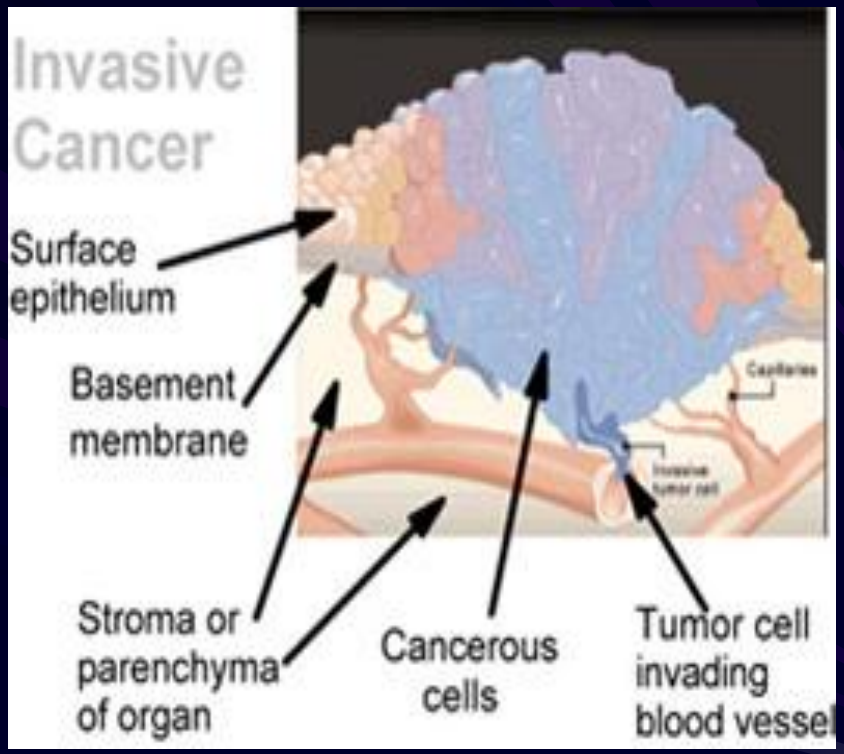
- Proliferation
- Apoptosis
- Altered metabolism
- Angiogenesis
- Modified growth factors and receptors

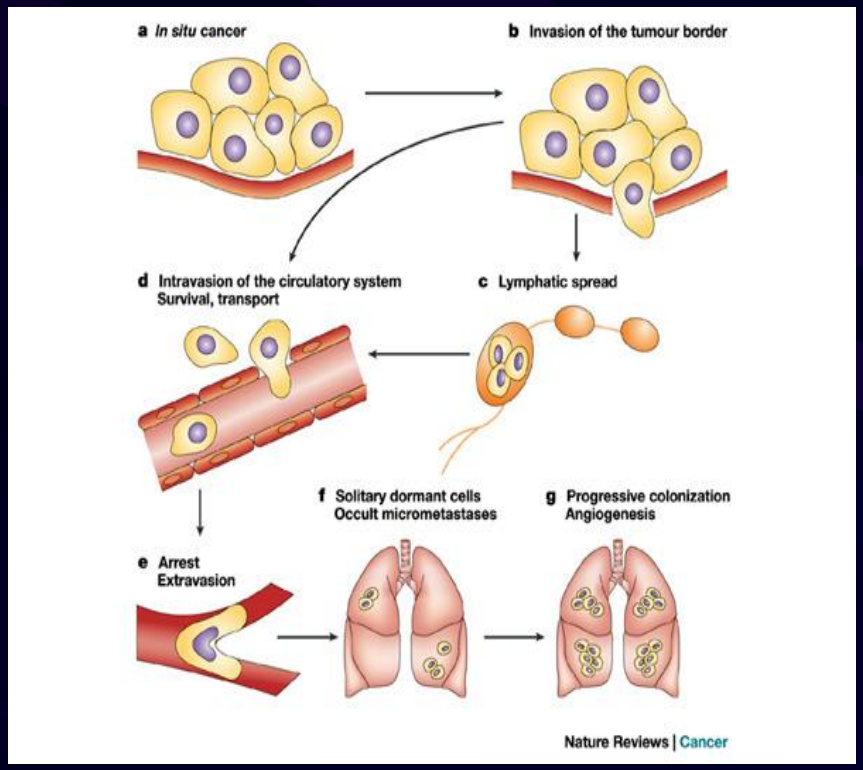


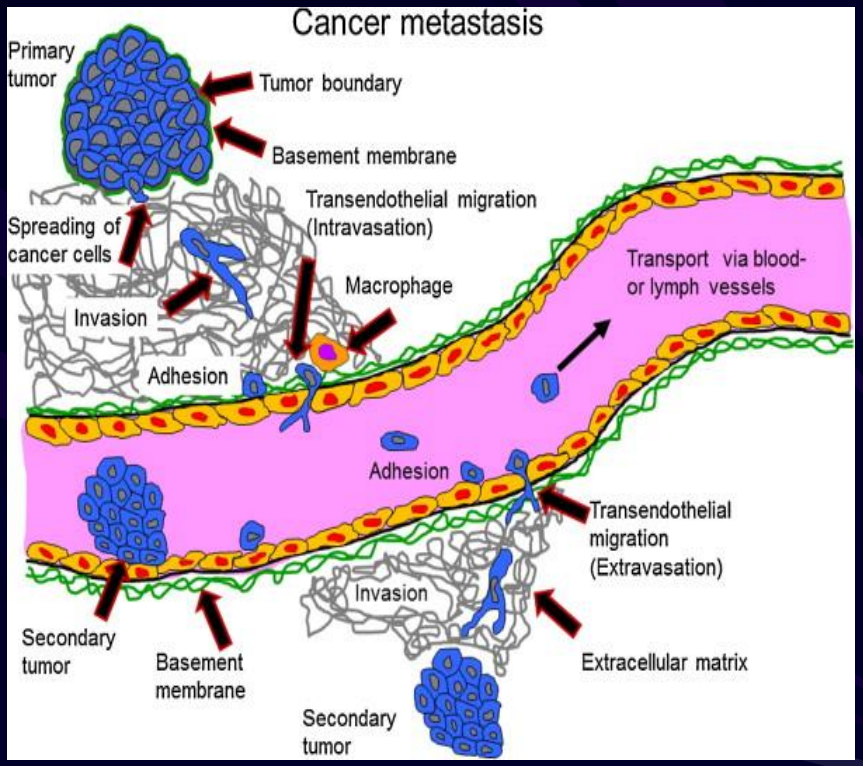
Neoplastic cells

- Alterations in cellular interactions

- cell-cell
- cell-stroma




a In situ cancer
b Invasion of the tumour border
d Intravasion of the circulatory system
Survival, transport
c Lymphatic spread
f Solitary dormant cells
Occult micrometastases
g Progressive colonization
Angiogenesis
e Arrest
Extravasion
Nature Reviews | Cancer


Cancer metastasis
Primary tumor
Tumor boundary
Basement membrane
Transendothelial migration (Intravasation)
Spreading of cancer cells
Macrophage
Transport via blood- or lymph vessels
Invasion
Adhesion
Adhesion
Transendothelial migration (Extravasation)
Invasion
Secondary tumor
Basement membrane
Extracellular matrix
Secondary tumor

Benign neoplasm

- Nuclear variation in size and shape minimal
- Diploid
- Low mitotic count, normal mitosis
- Retention of specialisation

Malignant neoplasm

- Nuclear variation in size and shape minimal to marked, often variable
- Range of ploidy
- Low to high mitotic count, abnormal mitosis
- Loss of specialisation

Benign neoplasm

- Structural differentiation retained
- Organised
- Functional differentiation usually

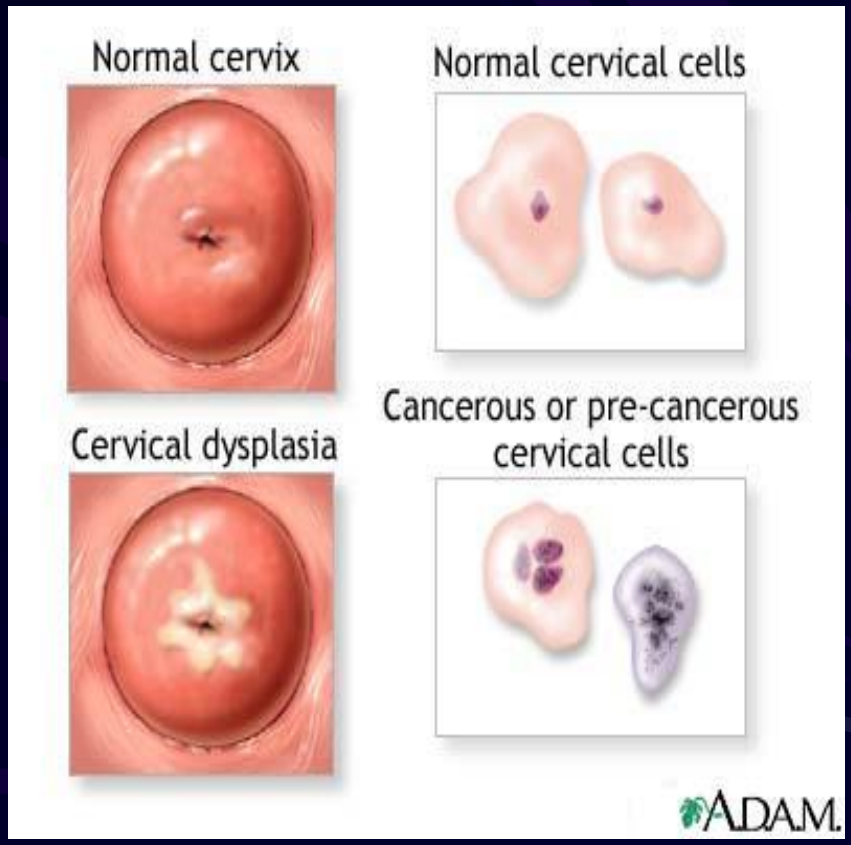
Malignant neoplasm

- Structural differentiation shows wide range of changes
- Not organised
- Functional differentiation often lost

Dysplasia

- Premalignant condition
- Increased cell growth
- Cellular atypia
- Altered differentiation
- Can range from mild to severe
- Sites -cervix
  -bladder
  -stomach

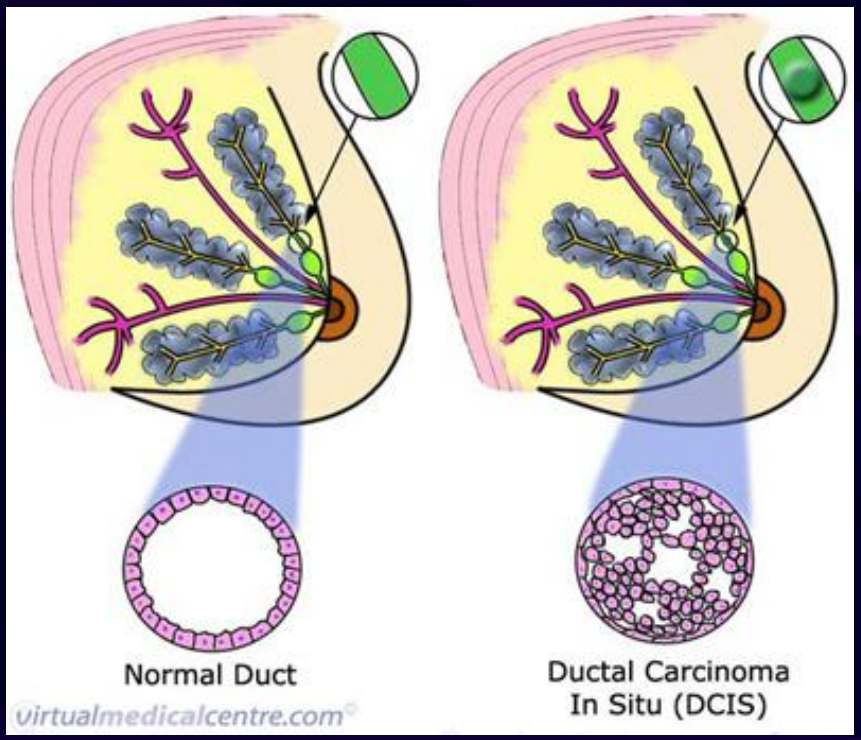

Case 54: Wart virus infection with CIN
metaplastic squamous mucosa
tall, columnar mucus-producing epithelium

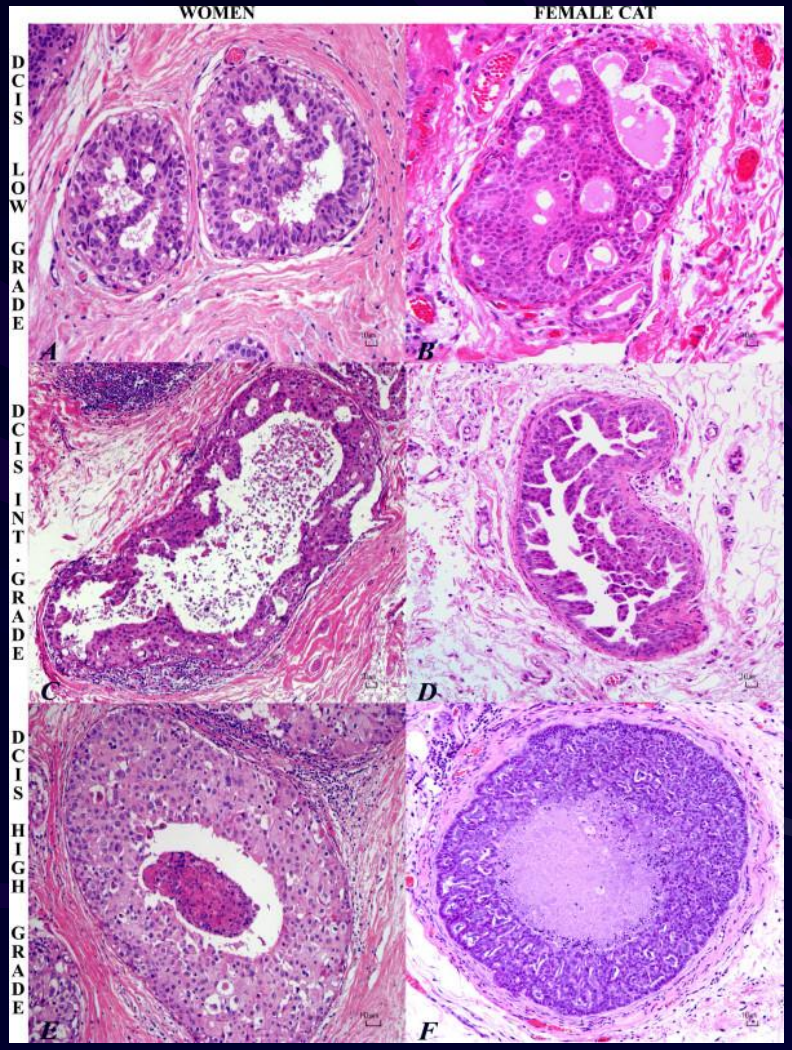

Normal cervix
Normal cervical cells
Cervical dysplasia
Cancerous or pre-cancerous cervical cells
A.D.A.M.

In-situ malignancy

- Epithelial neoplasm with features of malignancy
- Altered cell growth
- Cytological atypia
- Altered differentiation

BUT does not invade through basement membrane


Normal Duct
Ductal Carcinoma
In Situ (DCIS)
©virtualmedicalcentre.com


WOMEN
FEMALE CAT
DCIS LOW GRADE
DCIS INT. GRADE
DCIS HIGH GRADE
A
B
C
D
E
F

Types

- Benign vs Malignant

- Epithelial
- Connective tissue
- Lymphoid/haemopoietic
- Germ cell

Benign Epithelial

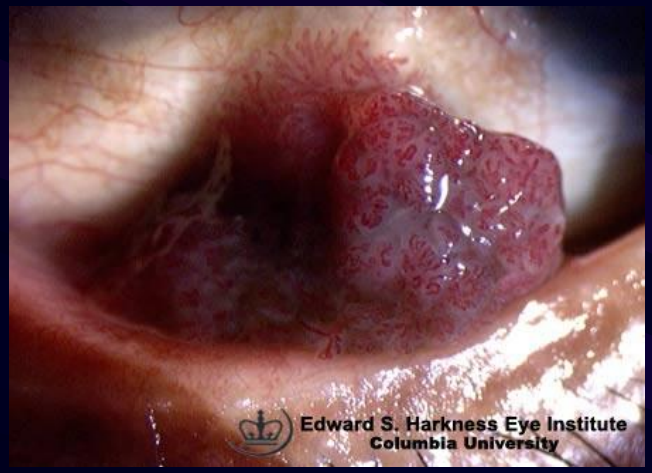
Papilloma

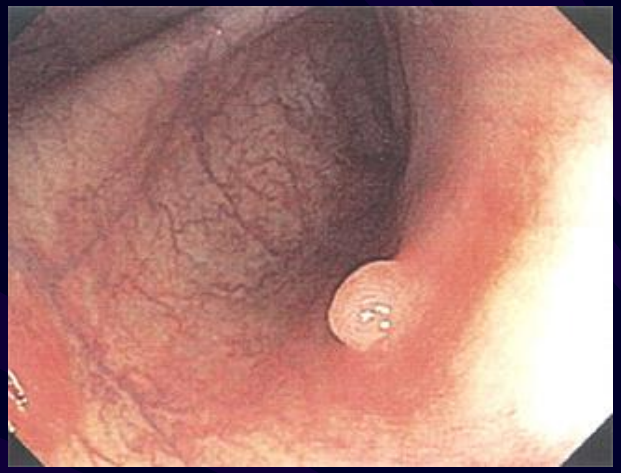
Squamous

Transitional

Adenoma

Glandular


Edward S. Harkness Eye Institute
Columbia University




Medscape

Malignant epithelial

Carcinoma

Squamous:	skin
Transitional:	bladder
Adeno:	stomach, colon, *ovarian*, etc etc
Basal cell:	skin

Benign Connective Tissue

Smooth muscle:	Leiomyoma
Fibrous tissue:	Fibroma
Bone:	Osteoma
Cartilage:	Chondroma
Fat:	Lipoma
Nerve:	Neurofibroma
Nerve sheath:	Neurilemmoma
Glial cells:	Glioma

Malignant Connective Tissue

Smooth muscle:	Leiomyosarcoma
Bone:	Osteosarcoma
Fibrous tissue:	Fibrosarcoma
Cartilage:	Chondrosarcoma
Fat:	Liposarcoma
Nerve:	Neurofibrosarcoma
Nerve sheath:	Neurilemmosarcoma
Glial cells:	Malignant glioma

Lymphoid

Lymphoma (B cell and T cell)

Hodgkins Disease

Haematological

Acute and chronic leukaemia

Germ cells

Testis

Teratoma

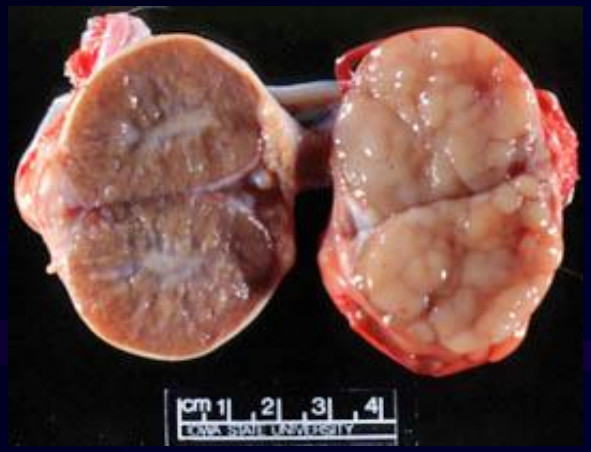
Seminoma

Ovary

Dermoid Cyst


CHU Sainte-Justine
1 cm


CHU Sainte-Justine
1 cm


cm 1 2 3 4


cm
1 2 3

Figure Two: Percentage of all Deaths Due to Cancer, WHO Regions of the World, 2008 Estimates

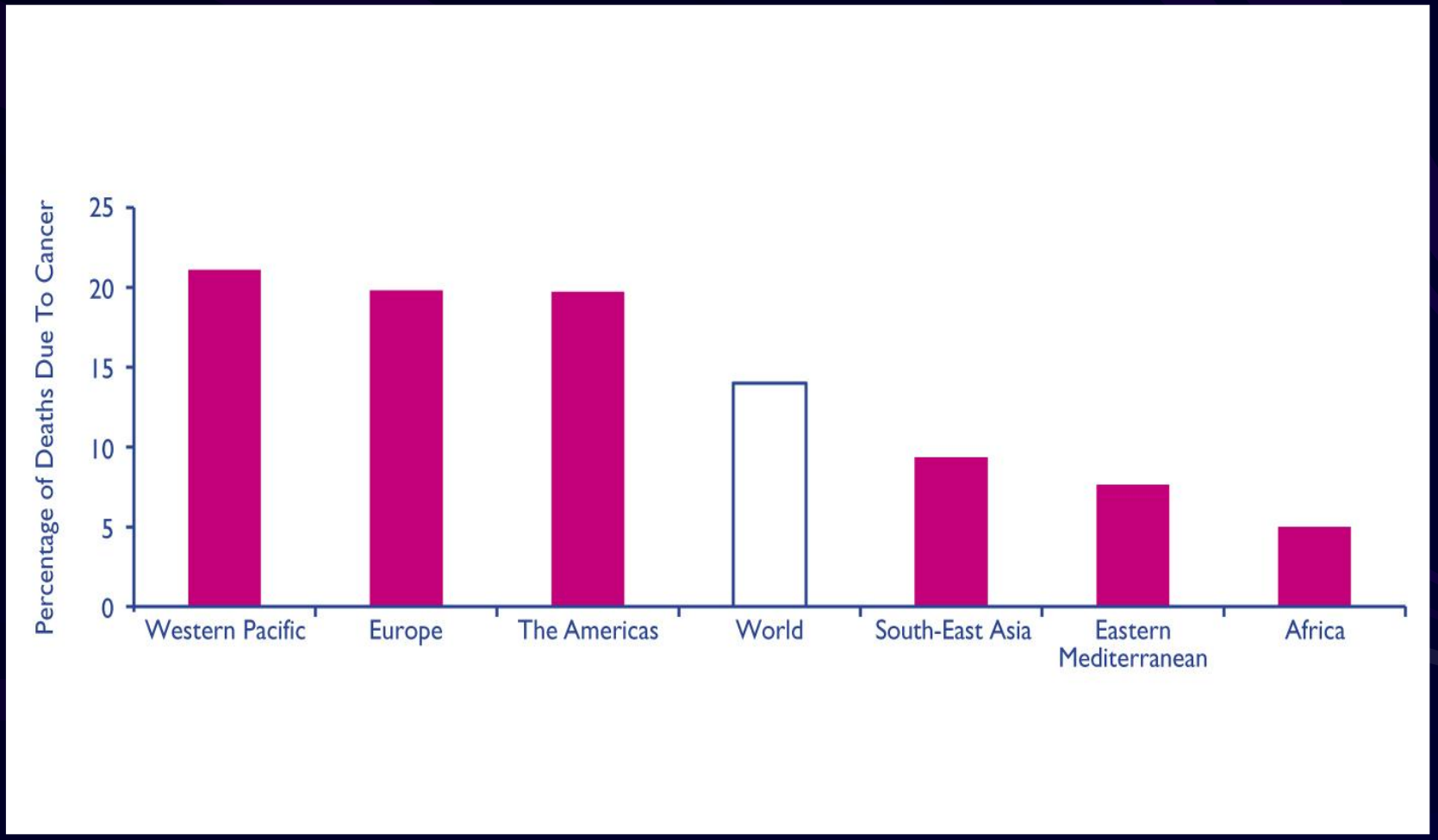


Figure Three: The 20 Most Common Causes of Death from Cancer Worldwide, 2008 Estimates

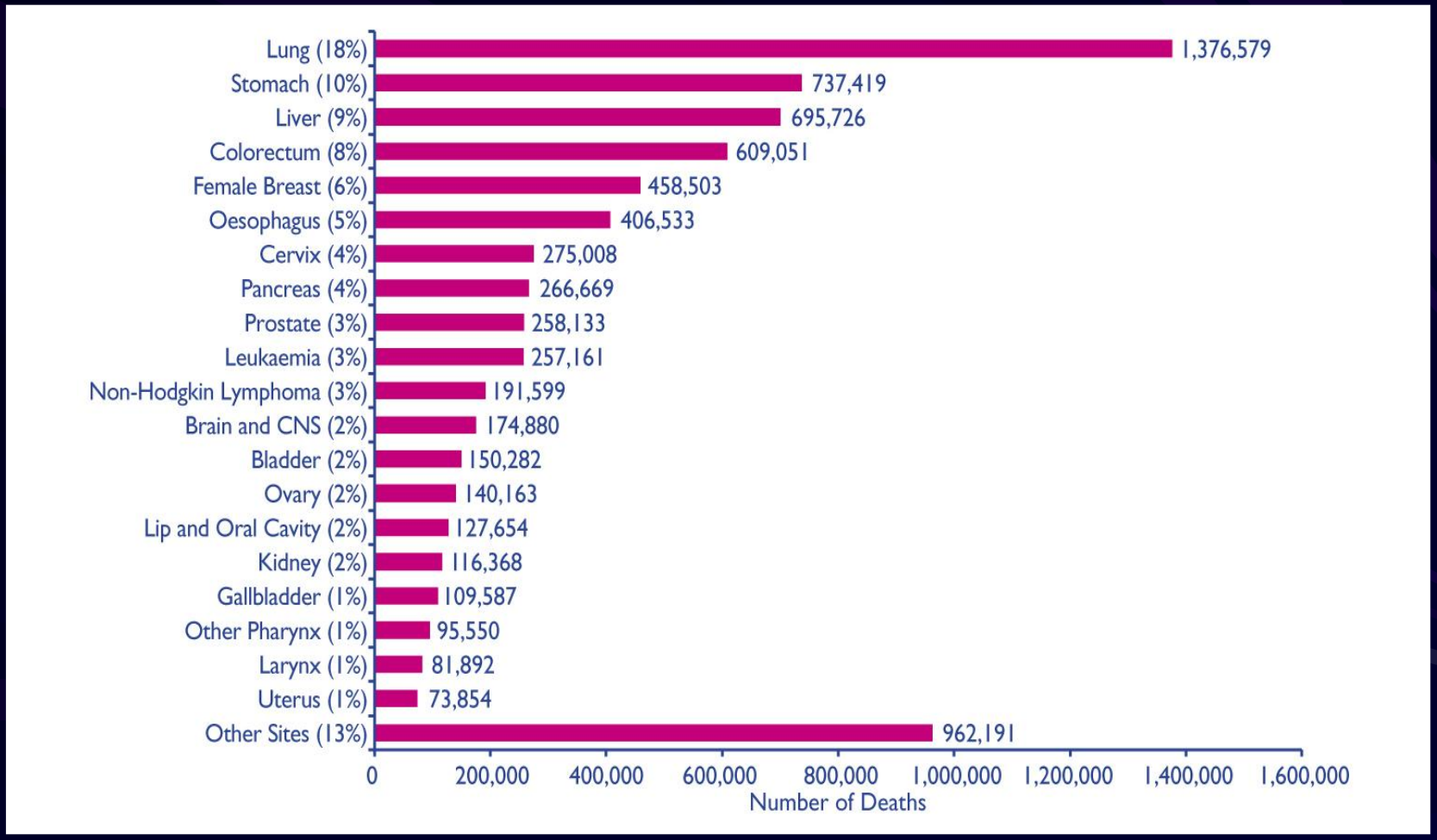
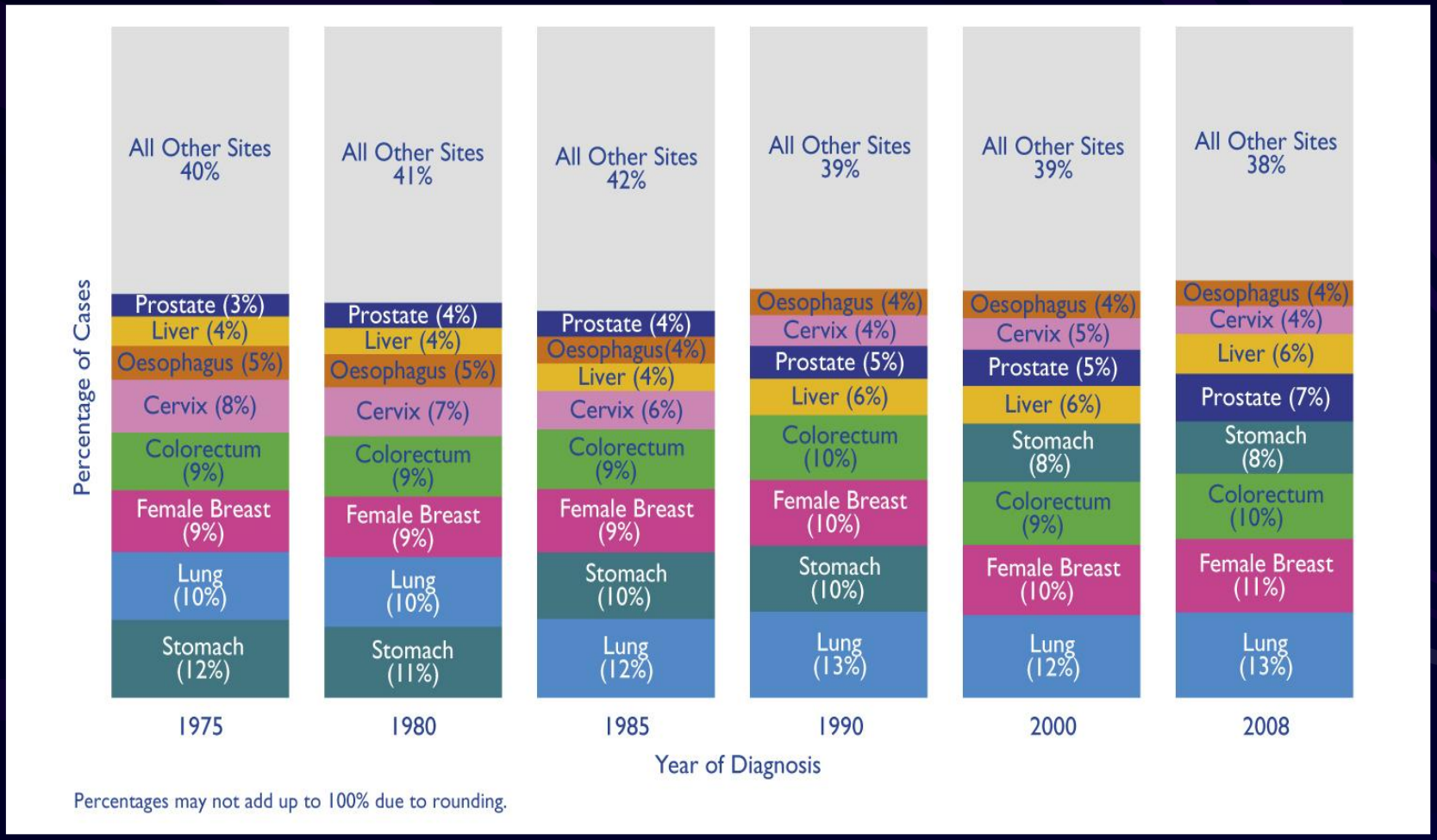


Figure Four: Trends in the Ranking of New Cases of Cancer Worldwide, Selected Cancers, 1975-2008



- Awareness
- Prevention
- Screening
- Treatment
- Surveillance

Thank you